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DATA EVALUATION RECORD

STUDY 6

CHEM 128974

Quinclorac

163-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY MRID 422941-05

Goetz, A.J. 1992. Soil desorption of ¹⁴C-residues produced during a study of the dissipation of ¹⁴C-BAS 514 H in a simulated rice field ecosystem. BASF Protocol No. 92025. BASF Report No. M9202. BASF Registration Document No. 92/5024. Unpublished study performed and submitted by BASF Corp. Research Triangle Park, NC.

DIRECT REVIEW TIME = 1

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This study was conducted to determine the extent to which the ¹⁴C-residues produced during a confined outdoor field dissipation study (Study 5, MRID 422941-07) would desorb from the soil and to characterize the residues.

CONCLUSIONS:

Mobility--Supplemental desorption study

This study is scientifically valid and provides supplemental information that indicates a significant portion of quinclorac residues remaining in the soil 216 days after application are associated with the humic material in soil and may bind to the soil following an application of quinclorac.

METHODOLOGY:

The soil samples analyzed in this desorption study were obtained from the test plots of the field dissipation study (Study 5, MRID 422941-07). For details of methods and materials used refer to the "Methodology" section in the DER of Study 5. Briefly, radioactive quinclorac was applied to two rice plots either before or after flooding at a rate of about 0.5 lb ai/A. The test plots were metal tanks measuring 35" W x 93" L x 23" D. About 15 cm of clay soil was placed in the bottom of each tank, followed by 5 cm of sandy loam soil. The tanks were planted to rice and maintained outdoors. The 6-inch soil samples (5 cores/plot) of interest for this study were collected from each treatment on 1/29/92, which corresponds to 216 days after treatment. For desorption studies, the 6-inch cores from each were further divided into three sections of 0-2", 2-4" and 4-6" and combined according to depth.

For each of the combined soil samples, ^{14}C -residues were desorbed by either shaking with one of several solvents (hexane, methylene chloride, ethyl acetate, methanol, deionized water, 0.01 N CaCl_2 or 0.01 N NaOH) or by refluxing with 0.01 N NaOH. The soil was not allowed to dry before desorption and the ratio of soil to desorption solvent was 1 g to 2 ml for shaking and refluxing. TLC with two mobile systems was performed on the ^{14}C -residues desorbed from the soil in the water phase in order to characterize the residues which might be available to move through the soil.

The radioactivity in the desorption supernatants was determined by LSC; and the radioactivity remaining in the soil was determined by combustion.

DATA SUMMARY:

The concentration of ^{14}C -residues in the soil samples from the nonflooded treatment and the flooded treatment are shown in Table 1. The concentration of ^{14}C -residues in the soil decreased with soil depth. At the 4-6" depth, the concentration of was 0.044 (11.5% TRR) and 0.037 ppm (8.6%TRR) for the nonflooded and flooded treatments, respectively. Conversely, the majority of residues remained in the 0-2" depth, since the % TRR was 49.3 and 77.6, respectively, for the nonflooded and flooded treatments. The authors suggest that the results indicate that the majority of the ^{14}C -residues in the soil following the application and dissipation of quinclorac in a rice cropping system will remain in the upper soil layers and not leach to a lower depth.

The distribution of ^{14}C -residues following the desorption of soil samples with each solvent and at each depth are shown in Tables 2, 3 and 4.

In general the amounts of residues desorbed are small, but they increase with increasing polarity of the desorption solvent. The least desorption was observed with the nonpolar solvents hexane and DCM (0.003 ppm maximum amount desorbed); the highest levels of residues were desorbed by water, CaCl_2 and NaOH (0.016ppm maximum amounts desorbed).

There were a much greater amount of ^{14}C -residues released from the soil by refluxing with NaOH. The amounts released were highest in the 0-2" depth at 0.121 and 0.060 ppm for the nonflooded and flooded treatments, respectively.

The lowest concentrations were released from the 4-6" depth. The results indicate that a large portion of the ¹⁴C-residues in soil are adsorbed and/or absorbed to the soil humic material and released when the humic material is solubilized by refluxing with NaOH.

Table 5 shows that distribution of the water-desorbed ¹⁴C-residues between soluble residues and humic substances. In both treatments only a small amount (0.001 ppm) of the residues were associated with soluble humic material. The majority of radioactive residues remained in the supernatant water phase (0.007-0.016 ppm). Quinclorac comprised the majority (69-80%, 0.005-0.01 ppm) of the ¹⁴C-residues recovered in the supernatant fraction and was the only residues of significance.

REVIEWER'S COMMENTS:

Previous studies [Stewart, J. January 1991. Freezer storage stability of quinclorac and its metabolites in soil - 0, 17, 21 month analysis. Registration Document No. 91/5016. Unpublished study performed and submitted by BASF Corp., Research Triangle Park, NC. MRID 417814-32] have shown that quinclorac is stable in soil that has been stored frozen for up to 39 months, respectively. Although no mention was made in this report in relation to length of storage of the samples, it appears that most of the samples were analyzed within 1-2 weeks of when they were collected. Therefore, no further information is needed related to storage stability of quinclorac in soil in regards to this study.